

Examination of nervous system

Examination of somatic sensations

To test for any sensation

- 1- Examine the subject with his eyes closed.
- 2- Start examination from periphery & proceed inwards.
- 3- Compare both sides right & left.

④ Fine touch & Crude touch Piece of Cotton

Differences

① Tactile localization:

Def.: Ability to localise exact point of touch with both eyes closed

Tested by: One limb of a caliper (blunt non sharp object)

Results: Hypoesthesia reduced touch sensation

Hyperesthesia painful, irritant or tingling sensation

② Tactile discrimination

Tested by Two limbs of a caliper

Def - The ability to feel 2 touched points simultaneously
- As 2 separate points
- With both eyes closed
- Provided the distance is above threshold distance.

Aim Record threshold distance at different areas of body

Result More accurate: Finger tip, lips, tongue, nipple.

Less accurate: Back of neck & back

e.g. Palm of fingers 2mm, palm of hand 5mm, dorsum of hand 7mm, forearm 9mm, upper arm 11mm, back of neck 30-40mm

Fovea → 2 microns

Two point discrimination is most accurate at fovea centralis

Factors influence the two-point discrimination:

- 1- The more the receptors
- 2- The lesser the receptive field
- 3- The more the cortical representation.
- 4- The less the convergence.



③ Stereognosis

Using coin or key

Ability to identify common objects placed in hand without the aid of vision i.e. with closed eyes

Requirement 1 Previous experience with the object
 2 All sensations especially fine touch
 3 Integrity of ms & their nerve supply i.e. no paralysis
Pathway Cuneate tract (upper part of body)
Asteriognosis Inability to recognize an object.....

[4] Texture of material : silk, wool or cotton.

(B) Weight discrimination:

Def Ability to compare between different weights to know weight

Receptors Pacinian corpuscles

Physiological basis Heavier weight stimulates more receptors
 sends more A. potentials

(C) Vibration sense: DM? vit B12 Def

Long arm vibrating tuning fork i.e. low frequency 150-250
 is placed on bony prominences to magnify the stimulus
 e.g. med. & lat malleoli, tibial tuberosity, ant. sup. ilial tuberosity, ribs
 manubrium, tip of shoulder, elbow, wrist, clavicle, patella, base of big toe.

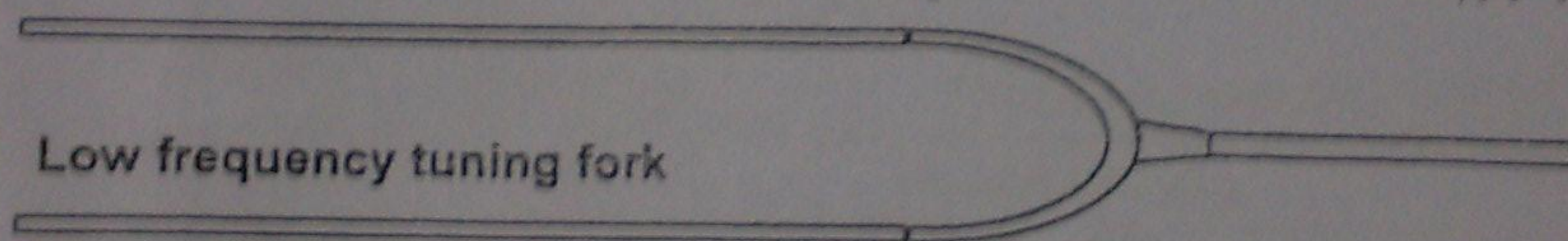
Receptors Pacinian corpuscles respond to vibration up to 500/sec.

Meissner's corpuscles respond to vibration up to 80/sec

subcutaneous
Tissue

Physiological importance: to judge the roughness of a surface

Clinical importance: it is absent if the pathway is injured e.g. tabes
 dorsalis or post. column lesion (Gracile and cuneate tract) as DM, Vit B12
 def., the patient feels the tuning fork as cold object.



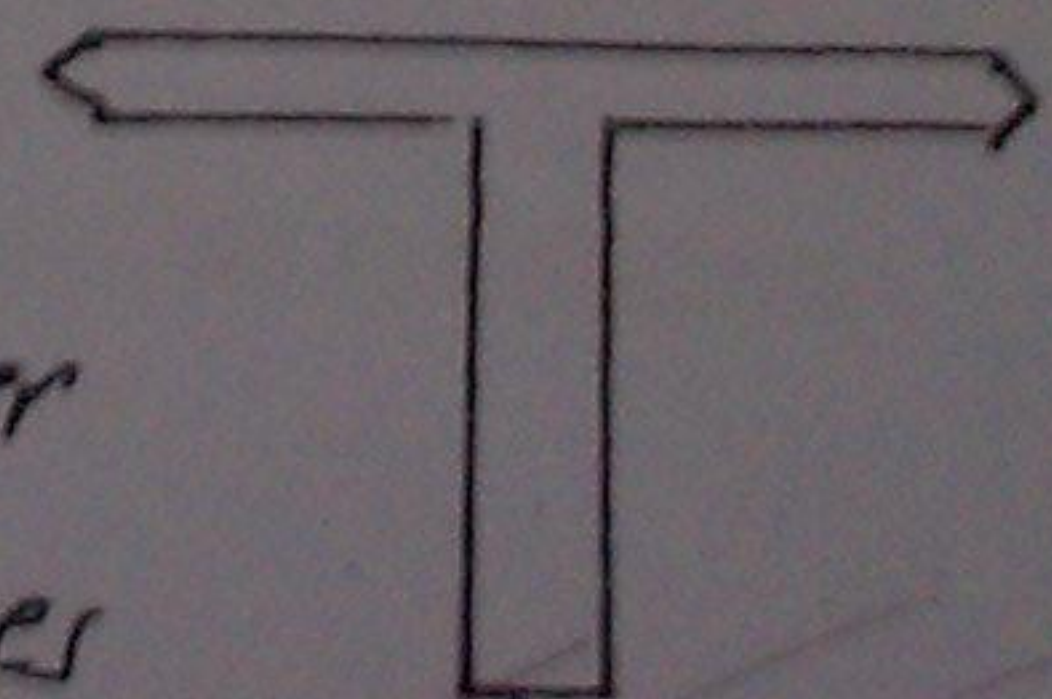
(D) Pain sensation:

- Superficial pain -----> Using pin. (pin prick)
- Pressure pain -----> put pressure on muscles, tendons or bones
- Referred pain ----- Dip the elbow in iced water, pain will be felt in the elbow, the after a while in the tips of fingers [along ulnar nerve distribution].

- ☒ Acute & chronic pain See theoretical notes.
- ☒ Deep pain..... See theoretical notes.

(E) Temperature sense:

Two test tubes containing warm & cold water
 Person should identify the temp differences



Aesthesiometer

Q Receptors, mechanism of thermal sensations & pathway
 Factors affecting thermal sensations

Examination of motor nervous system

Tools : Hammer, tongue, depressor, torchlight & measuring tape.

I Examination of bulk, tone & power of muscles

a Bulk of muscles ^{size}

- Inspect & palpate muscles of limb & trunk.
- Compare bulk of ms e.g. biceps on both sides using a measuring tape.
- Compare between thenar & hypothenar eminences.

b Tone of muscles

* Reflex subtetanic alternating contraction of skeletal muscles at rest.

* It is a static stretch reflex - Resistance of the ms to stretch

Receptors : Nuclear chain of muscle spindles (mainly)

Afferents : Primary and secondary

- Flex & extend the joints and notice the resistance to the passive movements & compare both sides.

-- resistance = hypotonia (flaccidity)
 ++ resistance = hypertonia

UMNL rigidity

Parkinsonian rigidity

* Paralysis	* Akinesia
* In <u>UMNL</u>	* In <u>Parkinsonism</u>
* Hypertonia in <u>antigravity ms.</u>	* Hypertonia in all muscles (more in <u>flexors</u>)
* It is due to ++ <u>gamma</u> motor neurons discharge	* It is due to ++ <u>alpha & gamma</u> motor neurons discharge
* It is <u>clasp knife</u>	* It is <u>lead pipe or cog wheel</u>
* It is accompanied by exaggerated tendon jerks & clonus.	* It is not accompanied by hyper-reflexia.

c Muscle power

1-Ask patient to close his eyes & holding his arms straight in front of him with palms up. Watch how he will maintain this position against gravity & on each side try to depress the patient outstretched arms against his resistance.

<u>Movement</u>	<u>Segmental innervation</u>	
Abduction of shoulder	C 5	C5
Flexion of elbow	C 5 - C 6	C56
Extention of elbow	C 7	C67
Grasp at fist	C 8	C78
Abduction of fingers	C 8 - T 1	C8T1
Hip flexion	L 2	
Knee extention	L 3 - L 4	
Dorsiflexion	L 4 - L 5	
Plantar flexion	S 1	

2 Test movements at different joints against your hand resistance

II Examination of reflexes Superficial, Deep & Visceral

A Superficial reflexes:

1) Corneal or conjunctival reflexes (see later).

2) Palatal reflex:

Touching m.m. covering the soft palate → elevation of the palate
Afferent: IX Center: medulla Efferent: X

3) Jaw reflex:

Striking the middle of chin leads to closure of jaw.

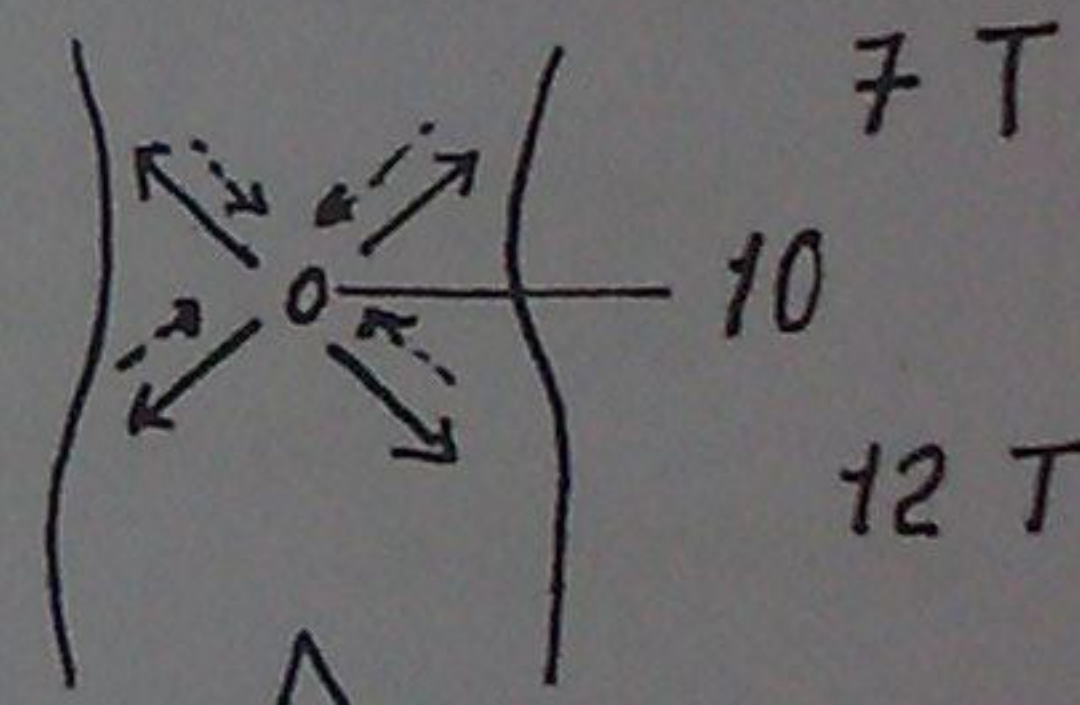
Afferent: V Center: Pons Efferent: V

4) Abdominal reflexes:

It is done by a slightly sharp point e.g. pencil stroking the skin of each side of the abdomen above and below the umbilicus.

▪ Upper abd. Reflexes → T 7-10

▪ Lower abd. Reflexes → T 10-12



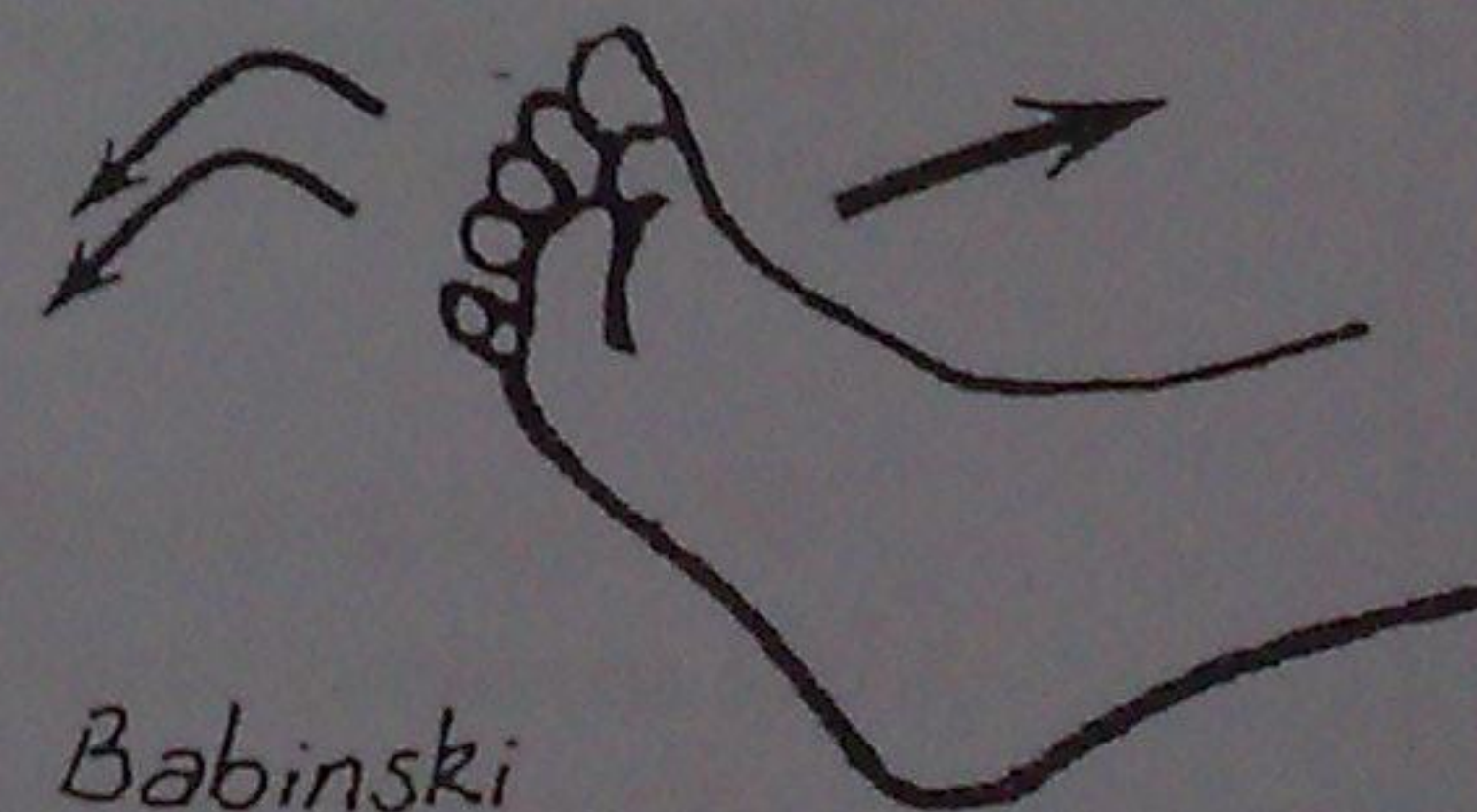
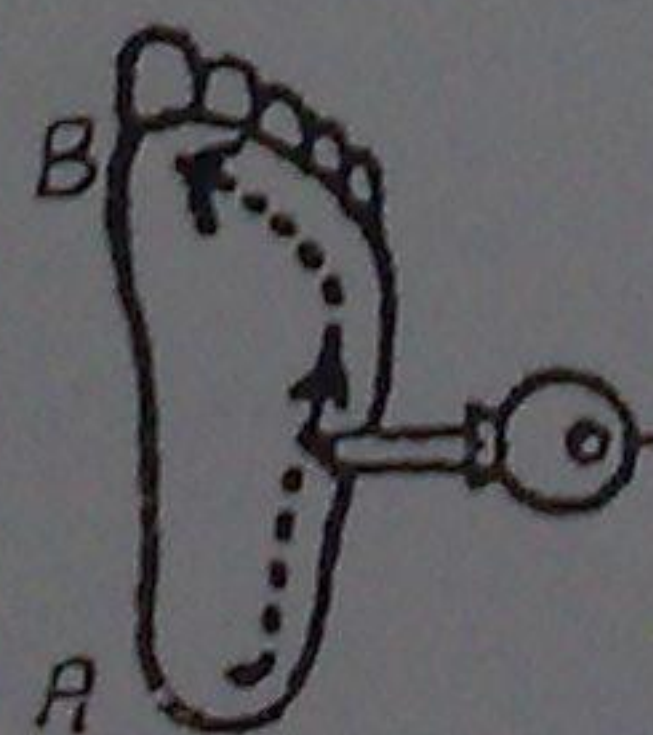
5) Plantar reflex

polysynaptic/superficial/spinal reflex

Stimulus firm scratch of the lateral aspect of the sole with key starting from the heel towards the little toe & then along the bases of the toes medially

Response planter flexion of all toes

Center 1-2 sacral



Abnormal response: Babinski sign in UMN i.e.

* Dorsiflexion of big toe due to pyramidal tract lesion

Fanning of other toes due to extrapyramidal tract lesion

Causes of Babinski sign:

- Pathological : UMNL.

- Physiological :

1- Infant in the 1st year, Δ tr is non-functional (unmyelinated) .

2- Deep sleep .

3- Deep general anesthesia .

4- During coma .

5- In epilepsy immediately after a seizure .

(B)

Deep reflexes (Tendon jerk) *muscles & tendons*

These are spinal, monosynaptic deep reflexes

* Steps

1- The examined muscle should be uncovered.

2- The muscle to be tested is put in the position that cause slight stretch to the muscle i.e. background of facilitation (muscle spindle is stimulated).

3- The examined muscle should be completely relaxed.

4- The response is increased by stimulation of γ efferent i.e. interlocking fingers in lower limb jerks (Jendrassik's phenomenon) clenching the teeth in upper limb jerks

It is dynamic stretch reflex:

*Stimulus: A sudden tap is applied to the muscle tendon (using a hammer)

*Receptors: Nuclear bag fibers (Ms spindles in muscle & not the tendon)

*Afferent: Primary afferent (annulospinal) Dynamic, rapidly adapting

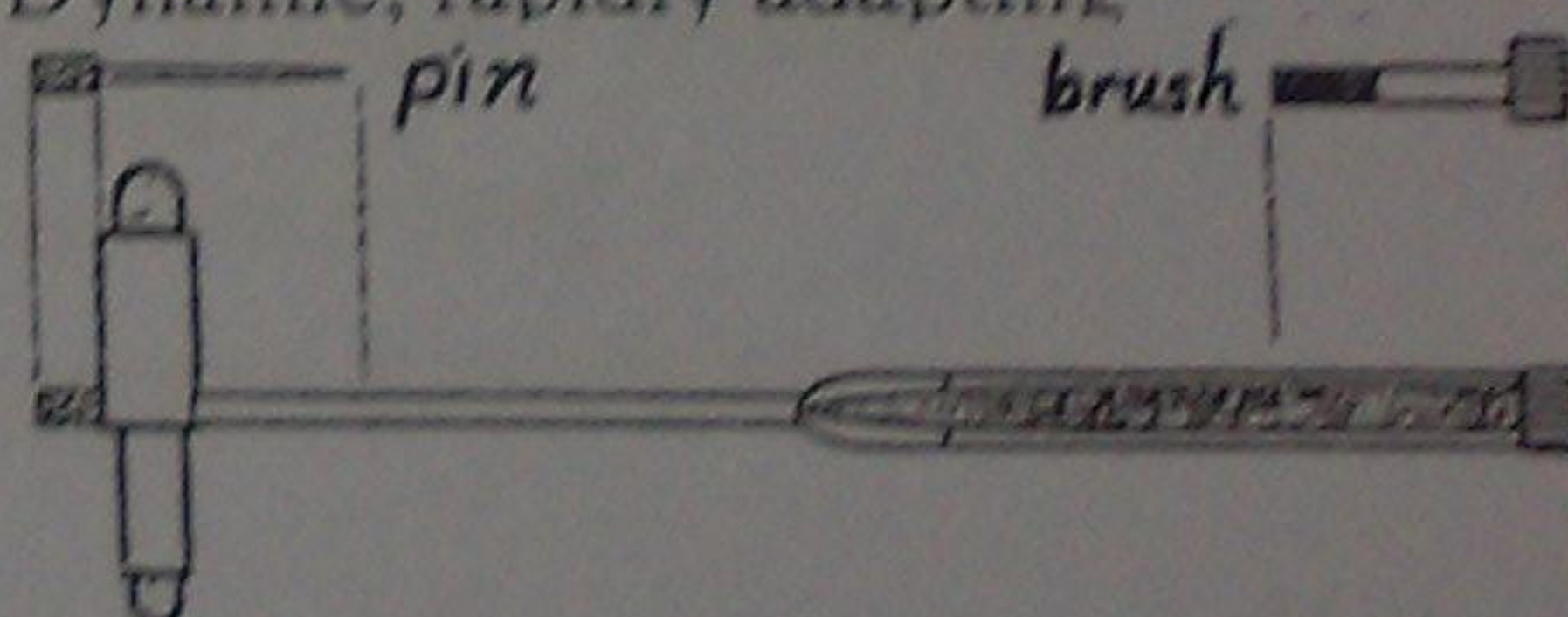
I_a 16 μ . Thick myelinated

*Center: monosynaptic in spinal cord.

*Efferent: A alpha

*Response:

Sudden contraction (++) muscle spindle followed by sudden relaxation of the (- - ms spindle or ++ Golgi tendon organ)



Tendon Jerks

Ankle jerk (Achilles reflex)

Center
1-2 sacral

Position
Dorsiflexion of ankle
Subject kneels on a chair

Knee jerk

3-4 lumbar

Flexion of knee 90°

Biceps jerk

5-6 cervical

Flexed forearm 120° & support the arm

Triceps jerk

6-7 cervical

Flexed forearm 90° & support the arm

Brachioradialis jerk

6-7-8 cervical

arm at midprone position
Tap above styloid process

Supraspinal facilitatory & inhibitory centres for stretch R

Facilitatory 4	Inhibitory 5
- Motor area 4 - Neocerebellum - Facilitatory R.F. - Vestibular nucleus <i>has intrinsic activity</i>	- Motor area 4s - Paleocerebellum - Inhibitory R.F. - Red nucleus <i>no intrinsic activity</i> - Basal ganglia

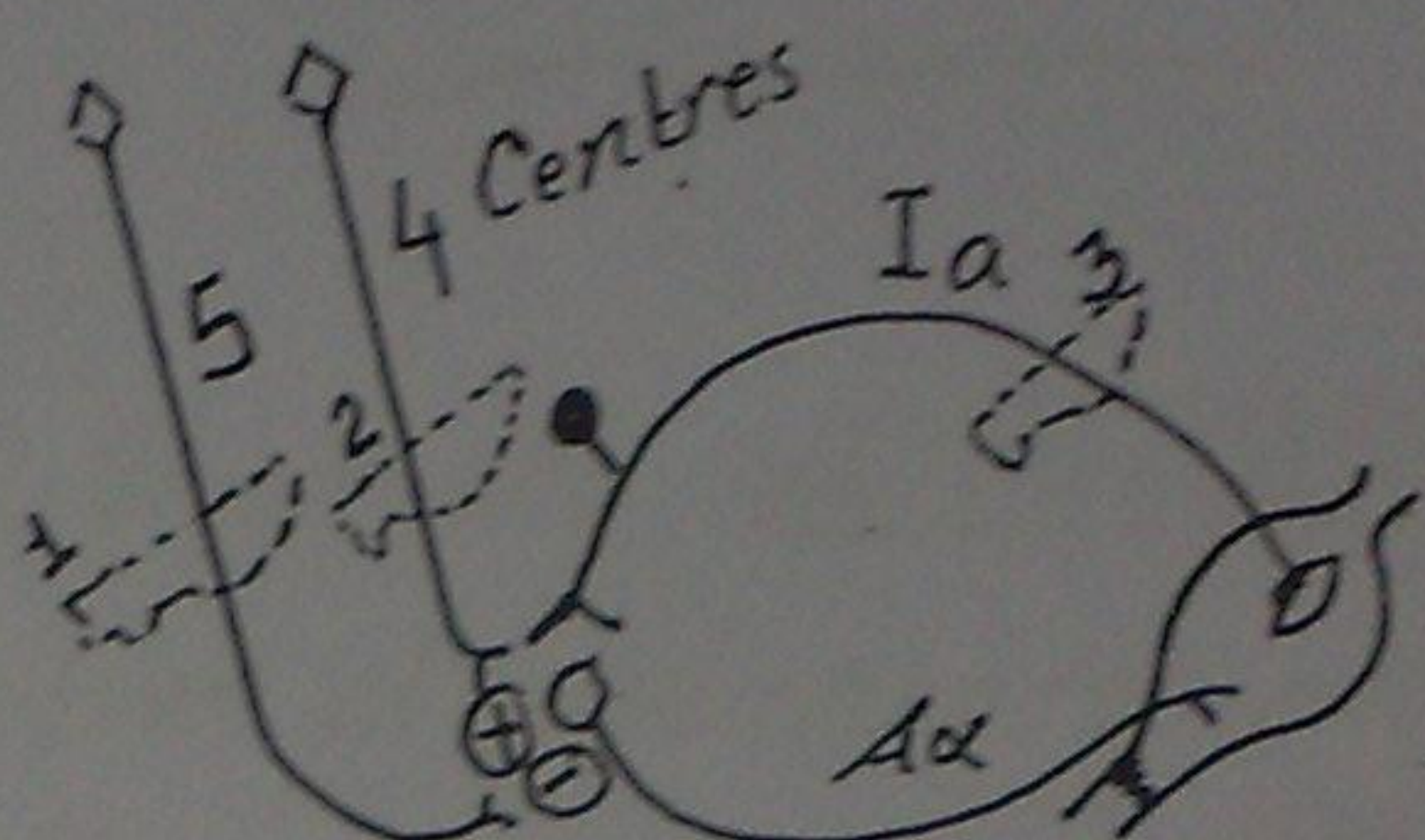
* The clinical importance of tendon jerk & muscle tone: 3X3

① Exaggerated in:

- a- UMN lesion e.g. internal capsule lesion
- b- Hyperthyroidism
- c- Anxiety

② Inhibited in

- a- Sleep & anesthesia
- b- Hypothyroidism (myxedema)
- c- Lesion in supraspinal facilitatory areas e.g. Neocerebellar lesion causes pendular knee jerk



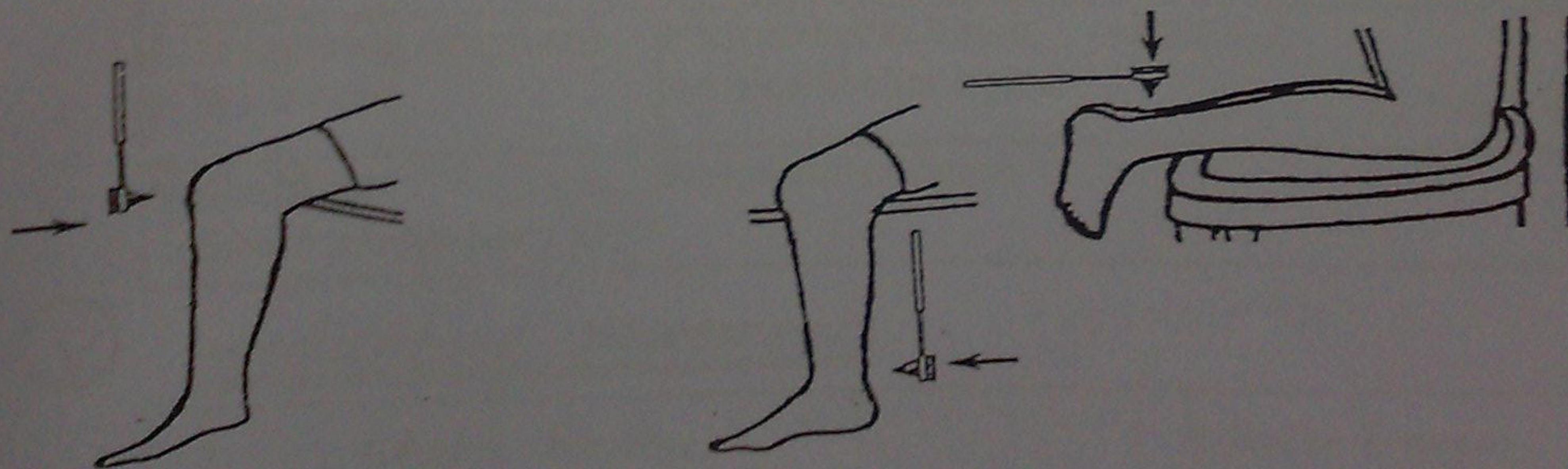
③ Absent if there is a lesion in the reflex arc e.g.

- a- Poliomyelitis
- b- Tabes dorsalis
- c- During spinal shock following complete T.S. of sp. cd.

N.B. if there is hyper-reflexia, examine for: 2

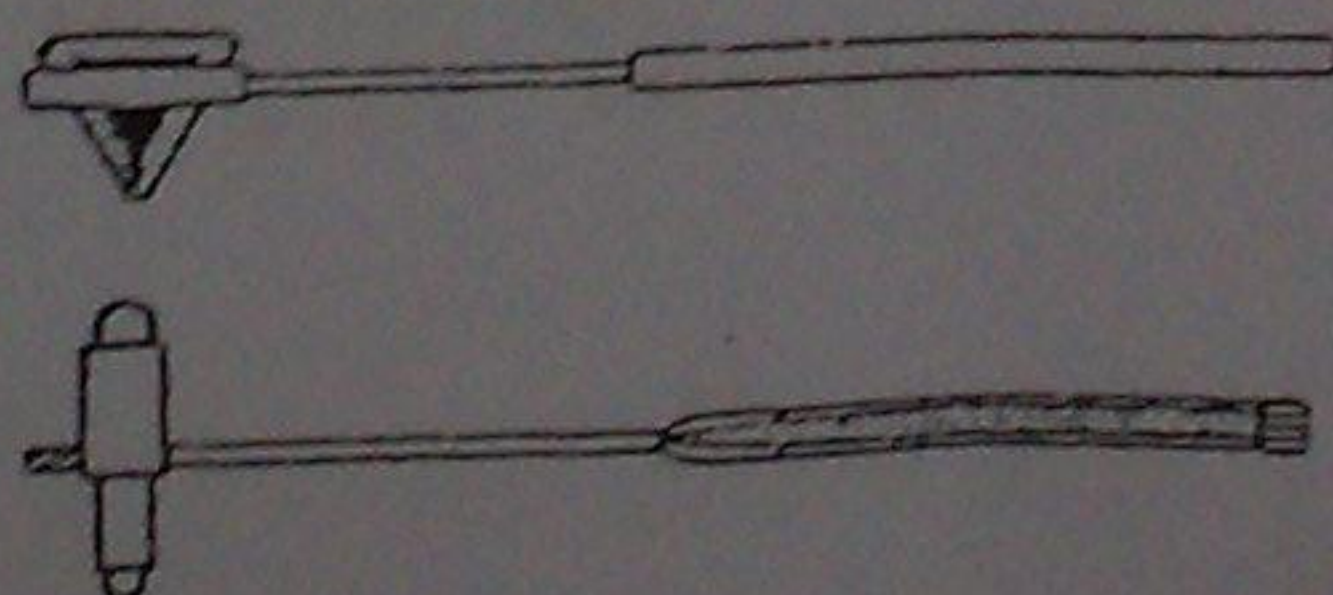
- Clonus: is ^{regular} rhythmic ms contraction in response to sudden maintained stretch of the muscle (*ankle & knee clonus*)
- Clasp knife rigidity (*lengthening reaction*)

* Types of knee jerk: Normal, absent, exaggerated & pendular



Knee jerk

Ankle jerk



Coordination of movement :

Of upper limb	Of lower limb
2- Finger- nose test 3- finger - finger test Abnormalities : - Dysmetria - - Kinetic tremors 4- dysdyadokokinesia 5- Arm pulling test 6- Rebound	1- Heel - knee test: Moving heel along anterior surface of the tibia of the opposite limb Decomposition of movement 

In neocerebellar disease, there are HYPOTONIA & ATAXIA
Ataxia In coordination of voluntary movement
 In absence of motor lesions (UMNL & LMNL)

IV Examination of gait :

Types of gait	Occur in
1- Circumduction (spastic)	Unilateral UMNL
2- Scissor	Bilateral UMNL
3- high steppage (Stamping gait)	Sensory ataxia e.g. dorsal column lesion of tabes dorsalis +ve Romberg's sign : patient with sensory ataxia can't maintain his posture with closed eyes Foot dropped (high) Not sensed (stamping) PSTV
4- Staggering (drunken)	Neocerebellar lesion. overshoot
5- Wide base	Archicerebellar lesion
6- Shuffling (Short steppage)	Parkinson's disease.

V Involuntary movements

1	Static tremors Basal ganglia (SN) Hypertonia During Rest	Lesion Muscle tone Time	Kinetic tremor Neo cerebellum Hypotonia During movement
2	Dancing movement with chorea (Caudate)		

In basal ganglia lesions there are [involuntary movement
 change in muscle tone

Reflexes in the frog

A Reflexes in frog with intact CNS

Reflex	Action	CNS center
	1- Place the frog on a board → vol. movements	Cerebral cortex
Postural reflexes	2- Put the frog on its back → it corrects its posture (postural reflex) 3- Put the frog in water → It swims 4- place it on tilted board → Frog tries to creep. 5- Pulling the leg → It corrects its position 6- Corneal reflex → Eye blinking	Brain stem
Spinal reflexes	6- Apply <u>conc</u> sulfuric or 10% acetic acid to frog's leg or Prick the frog with a needle → jumping away (flexor withdrawal reflex). 7- Apply <u>diluted</u> sulfuric acid or 1% acetic acid on frog's back → scratch reflex.	Spinal cord

B Decerebrate (Midbrain) frog ^{Midbrain & cerebrum}

Method - Cut head between eyes & tympanic membrane

Experiment 1 Spinal & postural reflexes are present
2 Voluntary movements are lost

Disappear by Deafferentiation or Decapitation.

C Reflexes in Spinal (decapitated) frog

Method Brain pithing by needle or
Decapitation by cutting head below tympanic membrane
Cover upper end of sp. cd by cotton soaked in Ringer's
Hang the frog from its lower jaw.

Stage of spinal shock i.e. Absent reflexes for few minutes

Stage of Recovery Recovery of reflexes

Irradiation of reflex activity

Definition: transmission of excitation from one neuron to another depends on the degree of excitation of nerve cells.

Methods:

Dip the leg in strong acid solution → extension of opposite leg
(Crossed extensor reflex)

- ④ Demonstration of tetanic convulsion
- * Inject 0.5 ml of 0.1% strychnine hydrochloride intraperitoneally.
 - * Cover it with a glass beaker.
 - * Deliver a blow to the bench.

- ⑤ Double pithed frog
- * destroy the spinal cord with a pithing needle.
 - * Record its effect on strychnine induced tetanic convulsion.
- Record its effect on spinal reflexes

SPECIAL SENSES

VISION

1 Visual acuity

Definition: It is the ability of the eye to perceive clear details and outlines of objects i.e. 2 point discrimination.

It is measured by the smallest distance by which two points may be separated without appearing as one point

- Fovea centralis has greatest visual acuity in photopic vision
- Mid-peripheral portion of the retina has greatest visual acuity in dim light vision

Test:

- A 1- Snellen letter chart
2- Landolt's chart (black incomplete circles of different size on a white background).

B If less than 6/60, get pt closer to chart one meter at a time

C Finger count

D Hand movement

E Light perception

F ERG

Snellen's chart

Landolt's chart

H	60	C
X E	36	○ ○
U N L	24	○ ○ ○

Requirements

- 1) 2 points make an angle of 1 minute at the nodal point of eye.
- 2) 2 images fall on 2 cones separated by at least one unstimulated cone.

Calculation of the visual acuity

If subject at 6 meters is able to read the letters that should be readable at 9 meters away, then his visual acuity = 6/9

- ❖ Distance 6 meters to avoid accommodation
- ❖ Normal acuity is 6/6 or 20/20 if you use the standard in feet.

2 Test for astigmatism Green's astigmatism chart
Cylindrical lens is used to correct astigmatism.

3 Test for colour vision

*Colour blindness:

- o Defect in cones (congenital)
- o Types

- 1- Monochromatic vision: only one type of cones
- 2- dichromatic vision: Prot, deuter or trit ANOPIA
- 3- Anomalous trichromate: Prot, deuter or trit ANOMALLY

1st common type: deuteranomaly then deuteranopia.

N.B. prot= red, deuter= green, trit= blue, anomaly= weakness & anopia= blindness.

o TESTS:

Ishihara charts: Each chart contains different - coloured dots arranged, so that the person with normal colour vision reads a number & the colour-blind person perceives a different number.

4 Test for accommodation

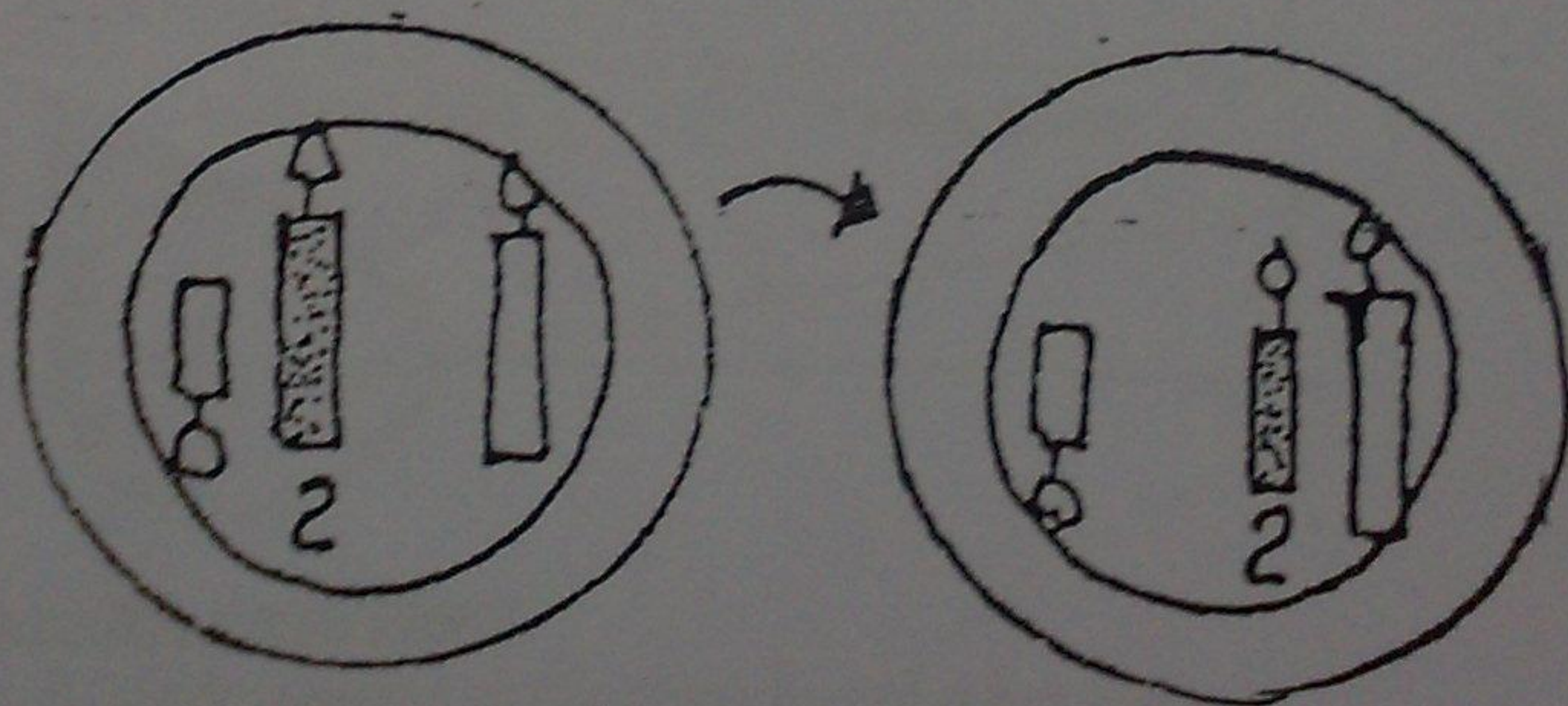
Accommodation reflex includes 3 components caused by 3rd cranial nerve

a) Pupilloconstriction (meiosis) decrease spherical & chromatic aberration.

b) Convergence of both eyes prevent diplopia. *voluntary part of oculomotor*

c) Contraction of ciliary muscle increases the lens power (accommodation). *parasympathetic part of oculomotor*

PURKINJE SANSON'S IMAGES USING A CANDLE



- Hold a candle on one side of the subject's eye & ask him to look at a distant object.

Observe the images of the candle that are formed in the eye:

- A clear small upright image → cornea
- A fainter larger upright image → ant. surface of lens
- A small inverted image → post. surface of lens

- Ask Pt to look to a near object

As accommodation occurs at the ant surface of lens, the faint large upright image becomes smaller & closer to other upright image. i.e. ++ curvature of ant. surface of lens

Determination of near point

Def.: NEAREST distance at which near object is seen clearly.
It is 8 cm at age 10y 100 cm at age of 70 years

Slowly bring a pin as close as possible to your open eye & stop when you no longer see a clear detailed letter. Measure the distance of the pin from the eye.

In adult, near point = 10 cm

***In presbyopia & hypermetropia, near point recedes away from the eye

***In myopia, near point comes closer to the eye

6

Determination of the blind spot (Optic disc)

*It is 3 mm to the nasal side of the fovea.

Clinical significance of Fundus examination: 4

1) Papilloedema

e.g brain tumor

Cup: disappears

Margin: red

Retinal vessels: distend

4) Glaucoma

++ Cupping

2) Hypertensive retinopathy

- narrowing of retinal arteries

- arterio-venous nicking

- Retinal haemorrhages & soft exudates

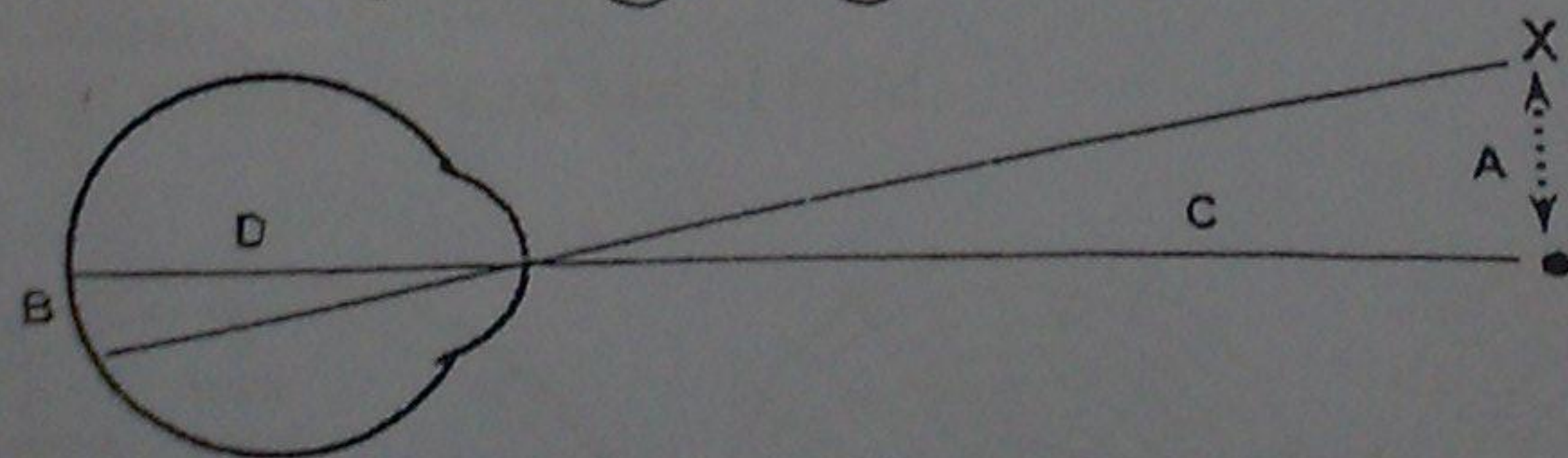
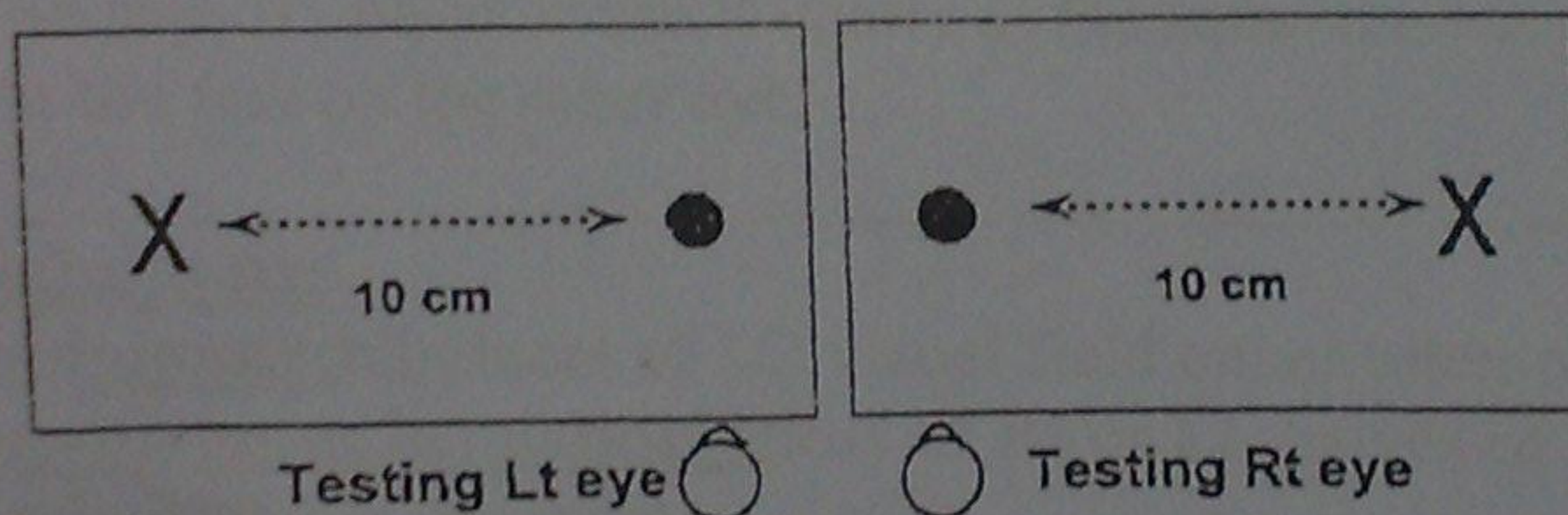
- Papilloedema

3) Diabetic retinopathy

- Capillary microaneurysms

- Retinal haemorrhages & hard exudates

- New vessel formation



• Cross & circle experiment

*Close one eye & Look steadily at the cross by the other eye.

*While moving the paper closer to the face, at a certain distance, the circle disappears from the field of vision because its image is falling on the blind spot of eye. If you continue to move paper towards eye, the cross reappears.

****The blind spots do not appear in the visual field because:

- In binocular vision: they do not exist at corresponding points of both retinae.
- In monocular vision: Incessant small movements of the eye i.e. physiological nystagmus.

Use the following formula to calculate the distance of the optic disc from the fovea of the eye: $A/B = a/b$ where
 A = distance between dot & cross on paper (10cm)
 B = distance between paper & the eye (measured in the experiment)
 a = distance between fovea & optic disc
 b = distance from lens to retina (1.5 cm)

7. Field of vision

Def All area seen by ONE FIXED eye

It is not circular

Temporal	90°	Inferior	80°
Nasal	60°	Superior	50°

The field is most extensive for white target and becomes smaller successively for blue, red & green targets

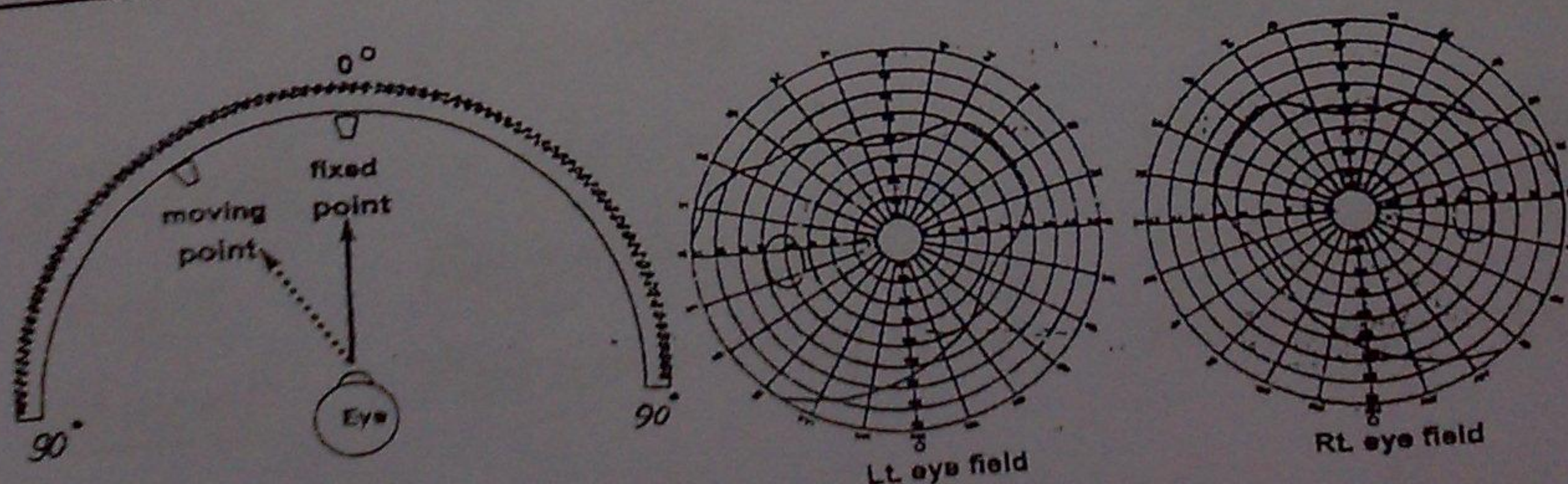
It is measured by perimeter or confrontation test or using black board

Confrontation method:

- a crude method where the examiner compares his field with that of the pt.
(2 meters)
- sit facing the pt with a distance of 60 cm. with both eyes on the same level.
- move a finger from the periphery in different directions. and ask the pt when he sees it. he must see it nearly at the same time as the examiner.
- repeat the test on the other eye.

***Definitions:

- 1- Hemianopia: blindness of 1/2 visual field either bitemporal or binasal
- 2- Homonymous hemianopia: loss of Rt. or Lt. halves of both visual field
- 3- Quadrantic: one quadrant
- 4- Scotoma: patchy loss of visual field.



Macular sparing occurs in lesion in area 17 in occipital cortex

Causes

- 1 Large area of representation in occipital cortex
- 2 Double blood supply
- 3 Bilateral representation

Lesion in visual pathway

1 Lesion of Lt optic nerve → ipsilateral blindness

2 Lesion of optic chiasma → bitemporal hemianopia

(Nasal)

3 Lesion of Lt optic tract → contralateral homonymous hemianopia (absent light reflex)

4 Lesion of Lt LGN → contralateral homonymous hemianopia (light reflex is present)

5 Lesion of Lt optic radiation →

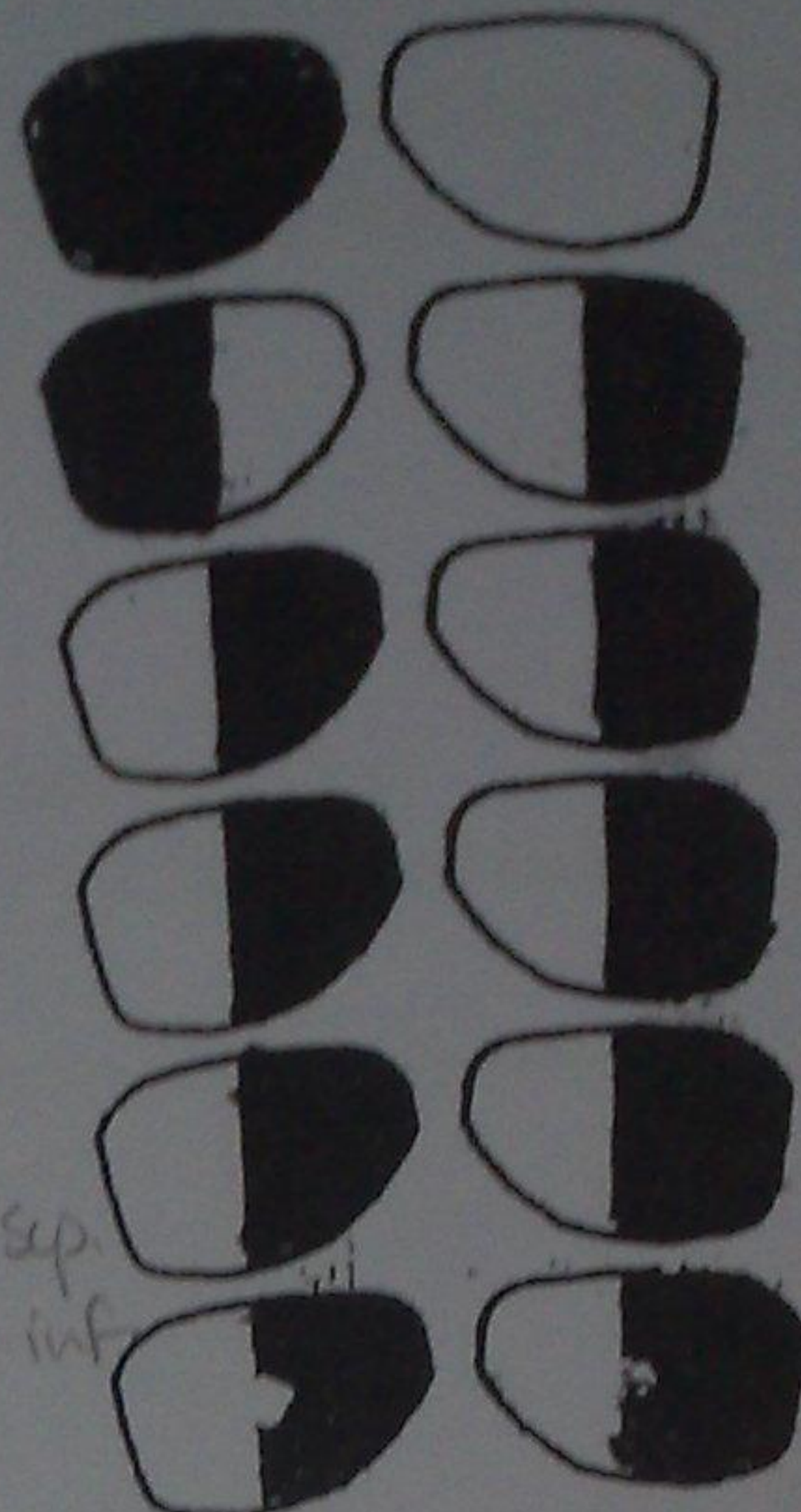
Temporal

quadrantic hemianopia

6 Lesion of Lt area 17 →

Macula is spared represented on 2 cortices has two blood supply

Lt Field Rt Field



8

Light reflex

Shine a light into one eye from one side → pupilloconstriction in both eyes. It is a protective reflex.

N.B. Light source approaches eye from lat. side to avoid Dazzle reflex (close eye) (AFF II EFF. VII)

****2 types of light reflex:**

a) Direct light reflex.

b) Consensual (indirect) light reflex.

***Afferent:** optic nerve, chiasma, tract (no relay in thalamus).

***Center:** pretectal nucleus in mid brain.

***Efferent:** oculomotor n. (parasympathetic division only)

*****Argyl-Robertson pupil:** lesion in pretectal nucleus due to syphilis → No light reflex but accommodation reflex is intact.

	Light reflex	Near Response
<u>Afferent</u>	no relay in LGN	visual pathway to area 17
<u>Centre</u>	Pretectal nucleus	Superior colliculus
<u>Efferent</u>	Parasymp of III nerve	Parasymp somatic of III nerve

In case of stimulation of right eye i.e. Rt eye direct stim

Lesion in nerve	Rt eye (direct)	Lt eye (indirect)
Rt oculomotor	Absent	Present
Lt oculomotor	Present	Absent
Rt optic	Absent	Absent
Lt optic	Present	Present

(13)

Corneal or conjunctival reflex

Touch the subject's cornea with a piece of cotton from the lateral side while he is looking up & in closure of the eye lids on both sides.

*Afferent: ophthalmic division of the trigeminal (V).

*Center: pons.

*Efferent: facial nerves on both sides (VII)

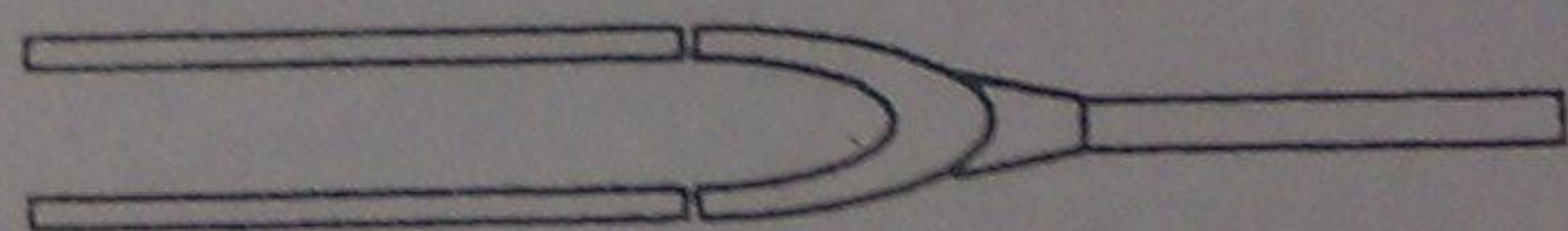
- Failure to close both eyes = trigeminal nerve lesion.
- Failure to close one eye = facial nerve lesion on the failed side.
- It's lost in 4th stage of anesthesia & coma

Hearing Tests

A) Tuning fork tests

- High frequency (short arm) tuning fork is preferred because most people have difficulty telling whether the vibration are felt or heard when forks of lower frequency are used
- The fork should be struck on a soft surface such as your palm, because striking a hard surface produces overtones.

High frequency tuning fork



1

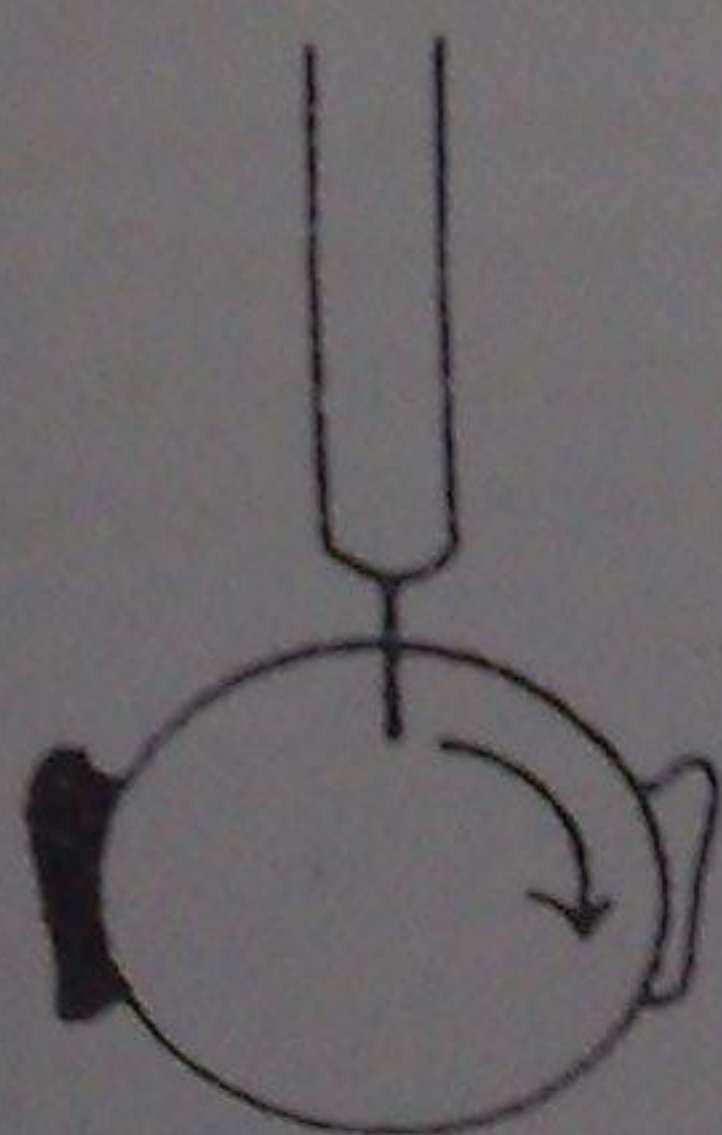
- Weber test:

Base of Vibrating tuning fork on the middle of forehead

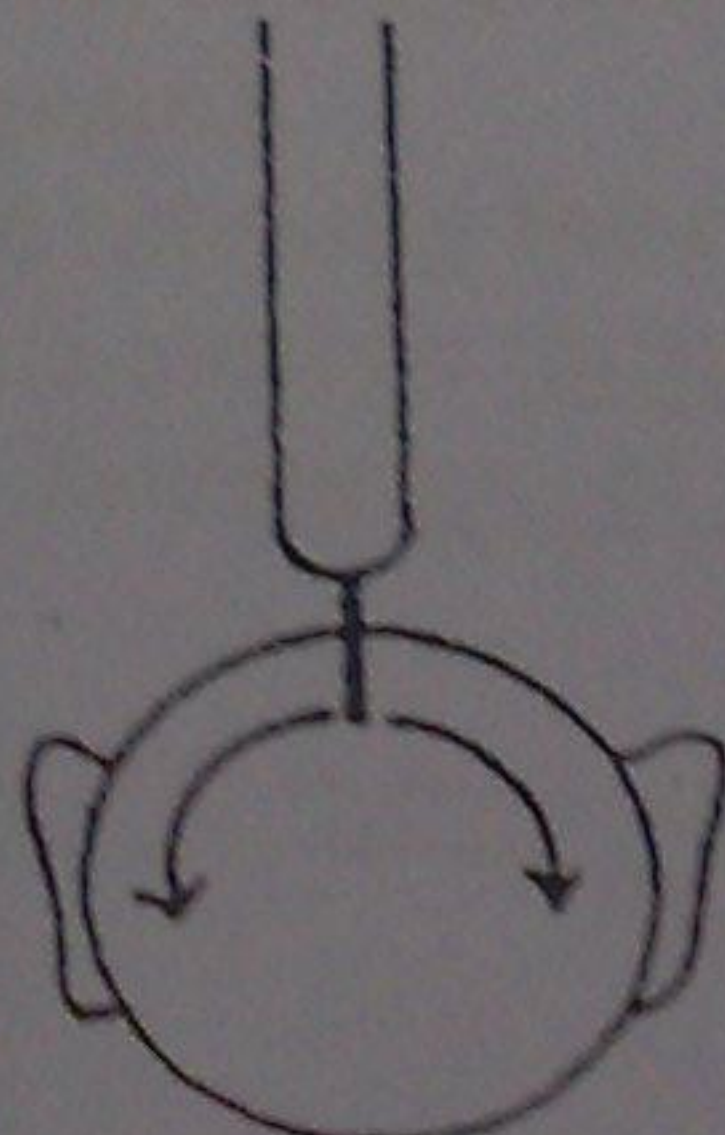
**In normal person, the sound is heard equally in both ears.

**In conductive deafness, the sound is heard better in the diseased ear because: in the normal ear, the sound will be partially masked by the environmental noise to which the defective ear is less sensitive.

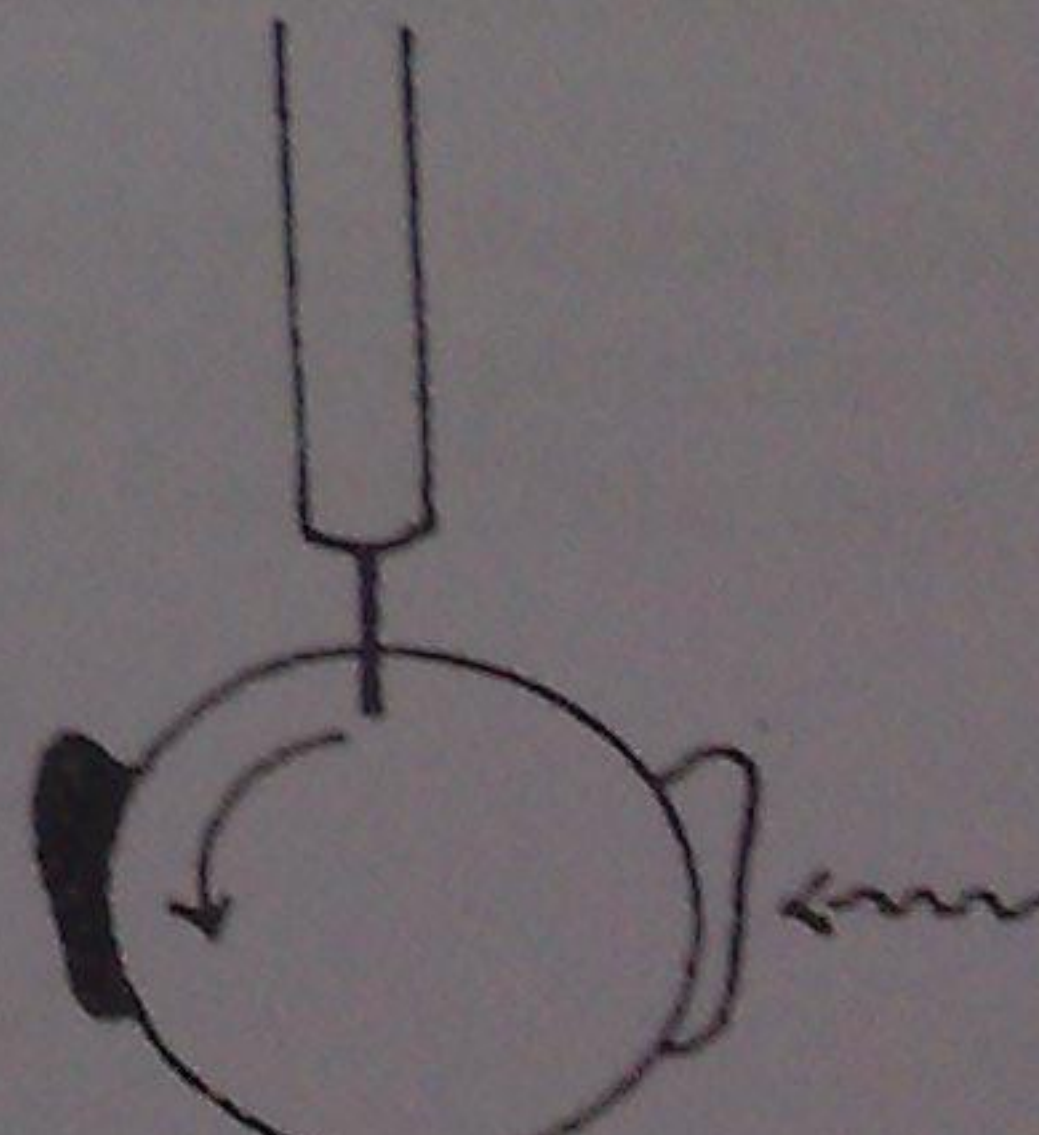
** In nerve deafness, sound louder in normal ear



nerve



normal



conductive

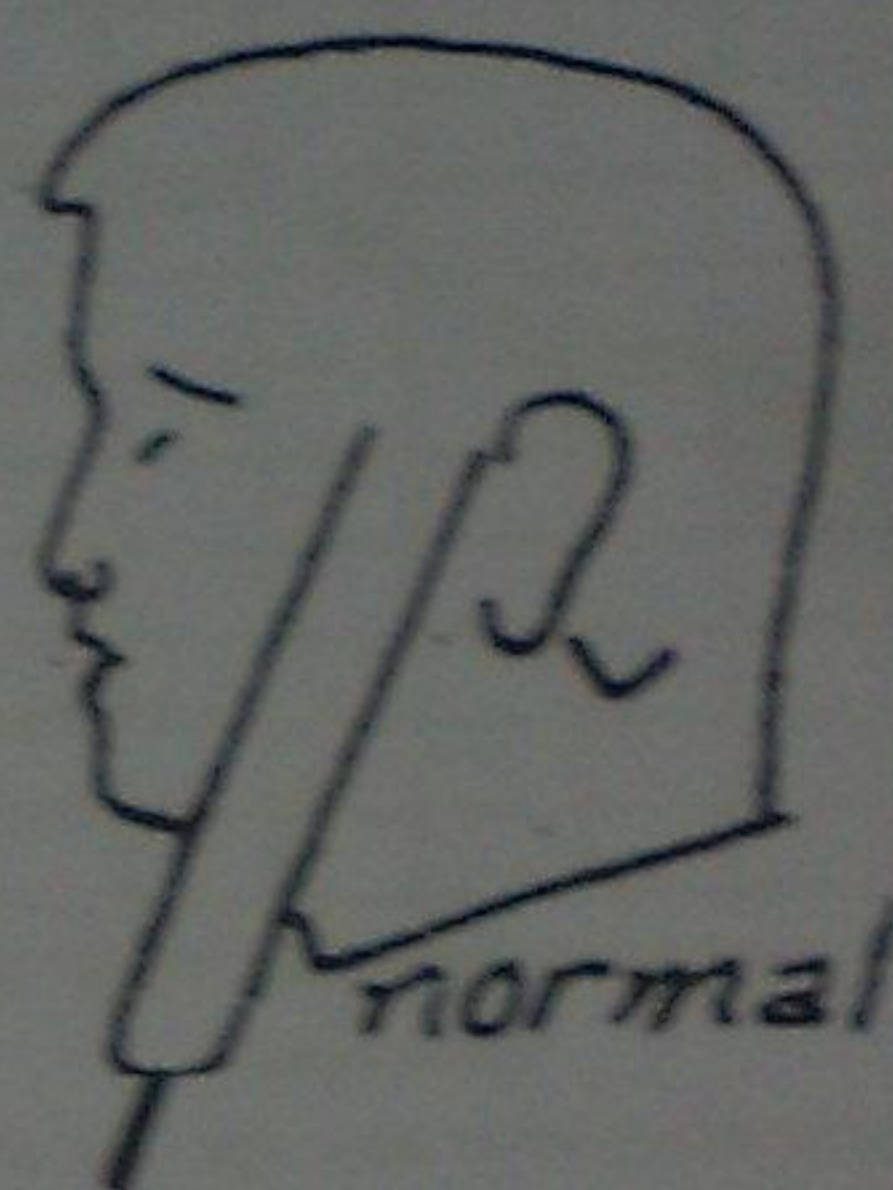
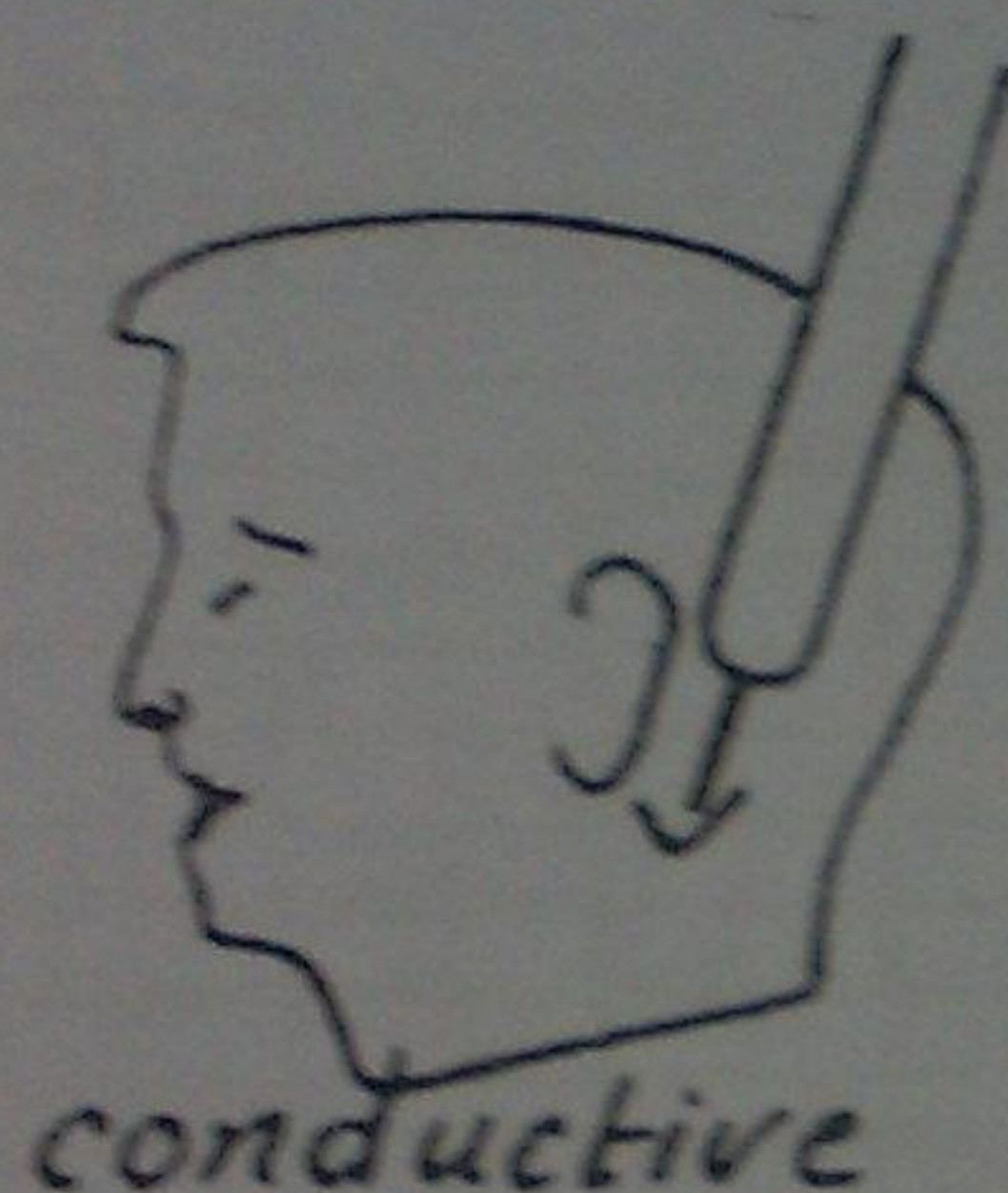
Rinne test

Base of vibrating tuning fork on the mastoid process, till the person can't hear its vibration, now put the fork near the ear.

- In normal person, he hears vibrations in air after bone conduction is over
- In conductive deafness, the subject does not hear sounds in air after bone conduction is over
- In nerve deafness
 - Partial : Pt still hear vibration in air after bone conduction is over
 - Complete : Pt doesn't hear bone or air conduction.

Explanation Air conduction allows amplification of sounds 22 times.

- Area of tympanic membrane is 17 times area of oval window.
- Lever like action of ossicles



Pure tone Audiometry

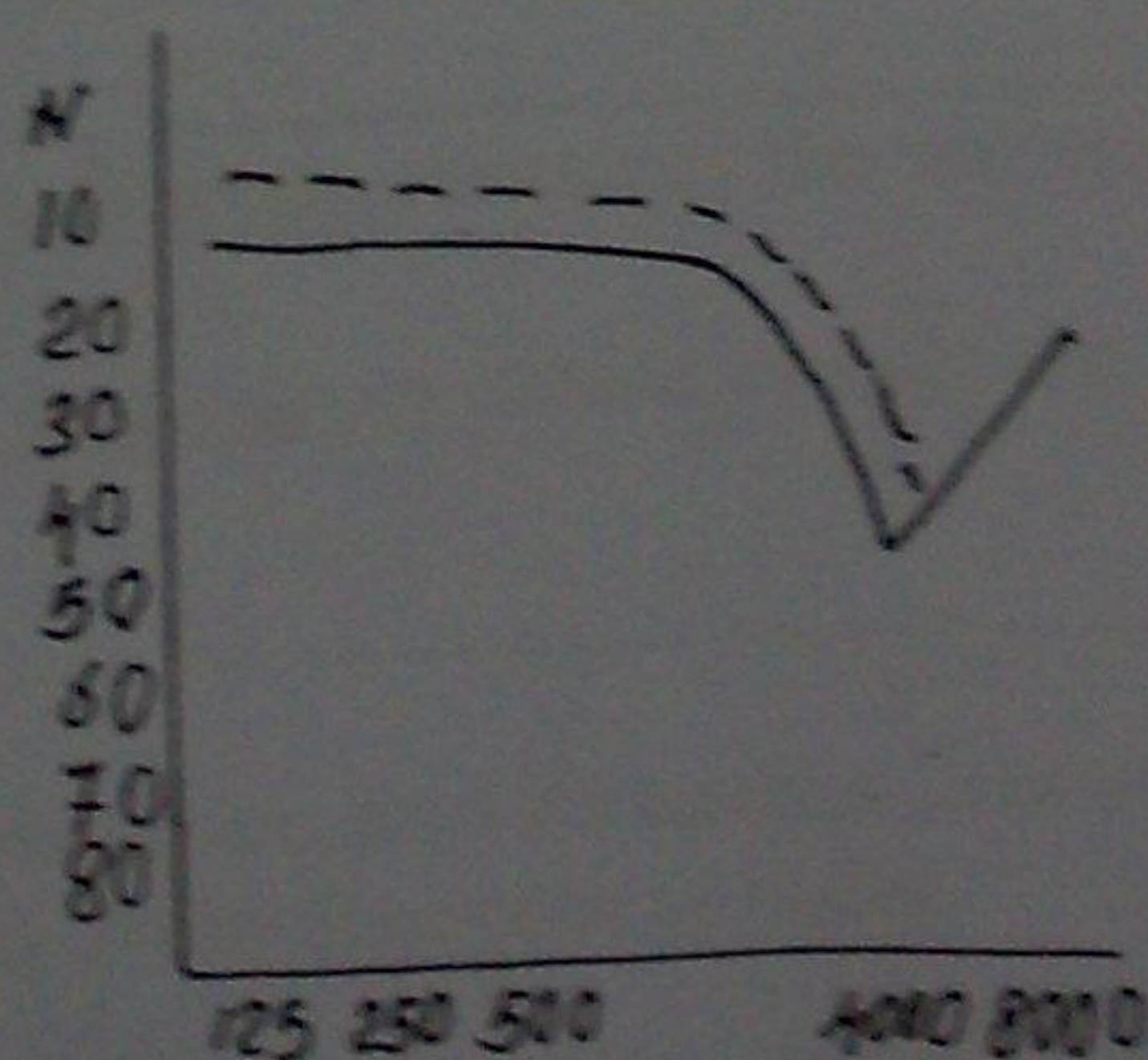
Audiometer is used for measurement of hearing disabilities

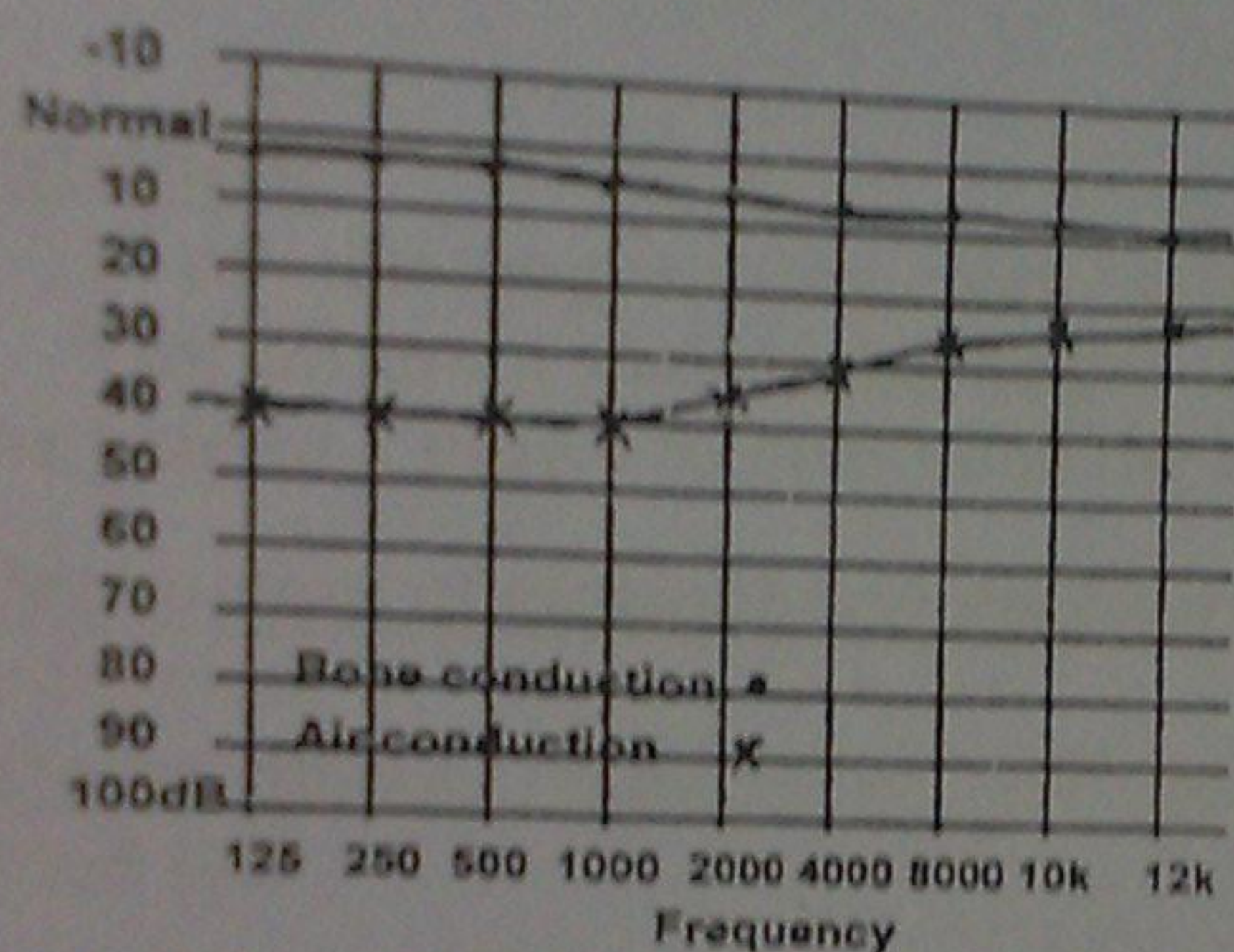
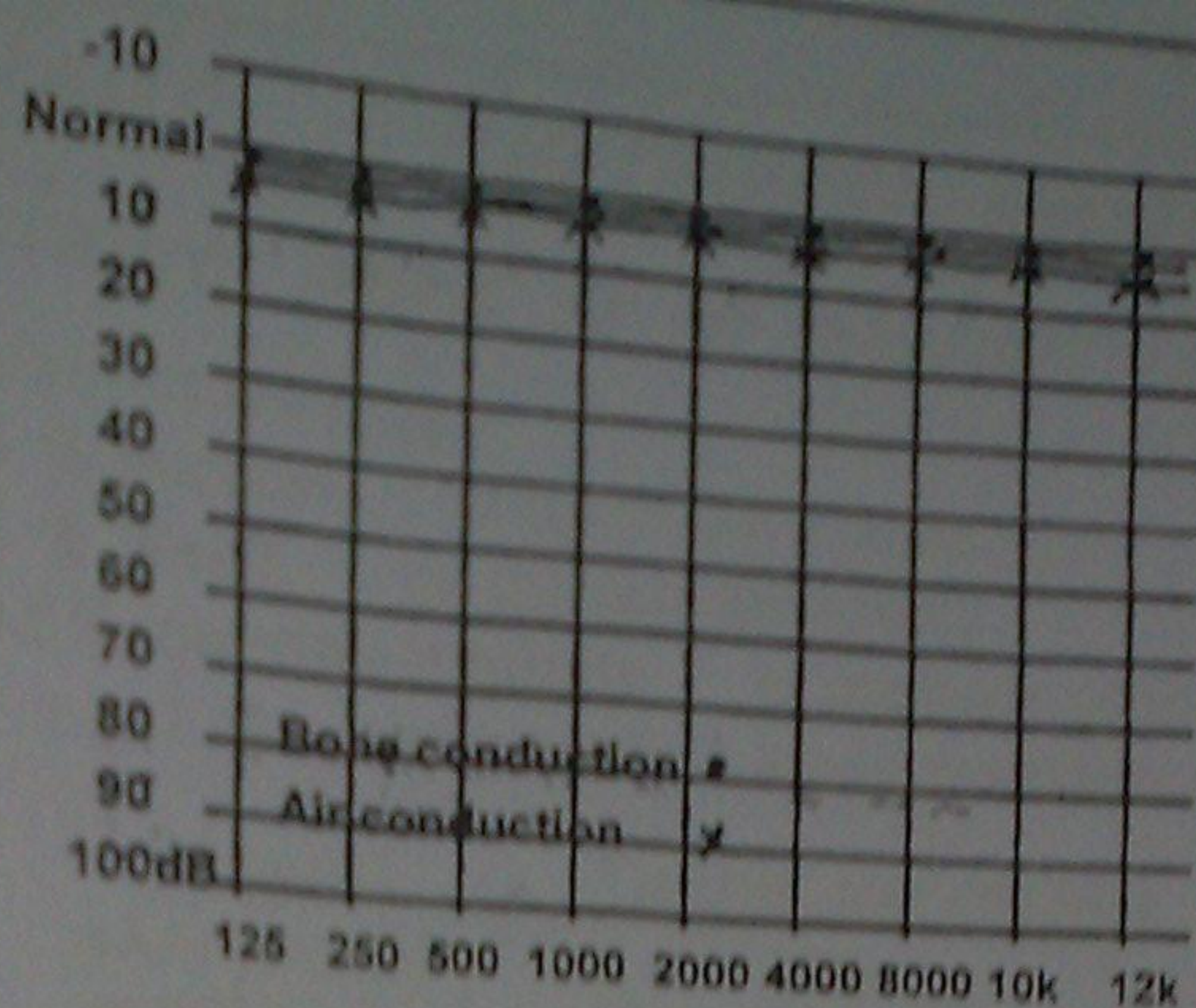
Audiometer consists of earphone connected to electronic oscillator that emits pure tones of various frequencies.

The tones intensity is regulated, so that auditory thresholds (the loudness needed to just hear) of each frequency can be determined & recorded on chart (audiogram).

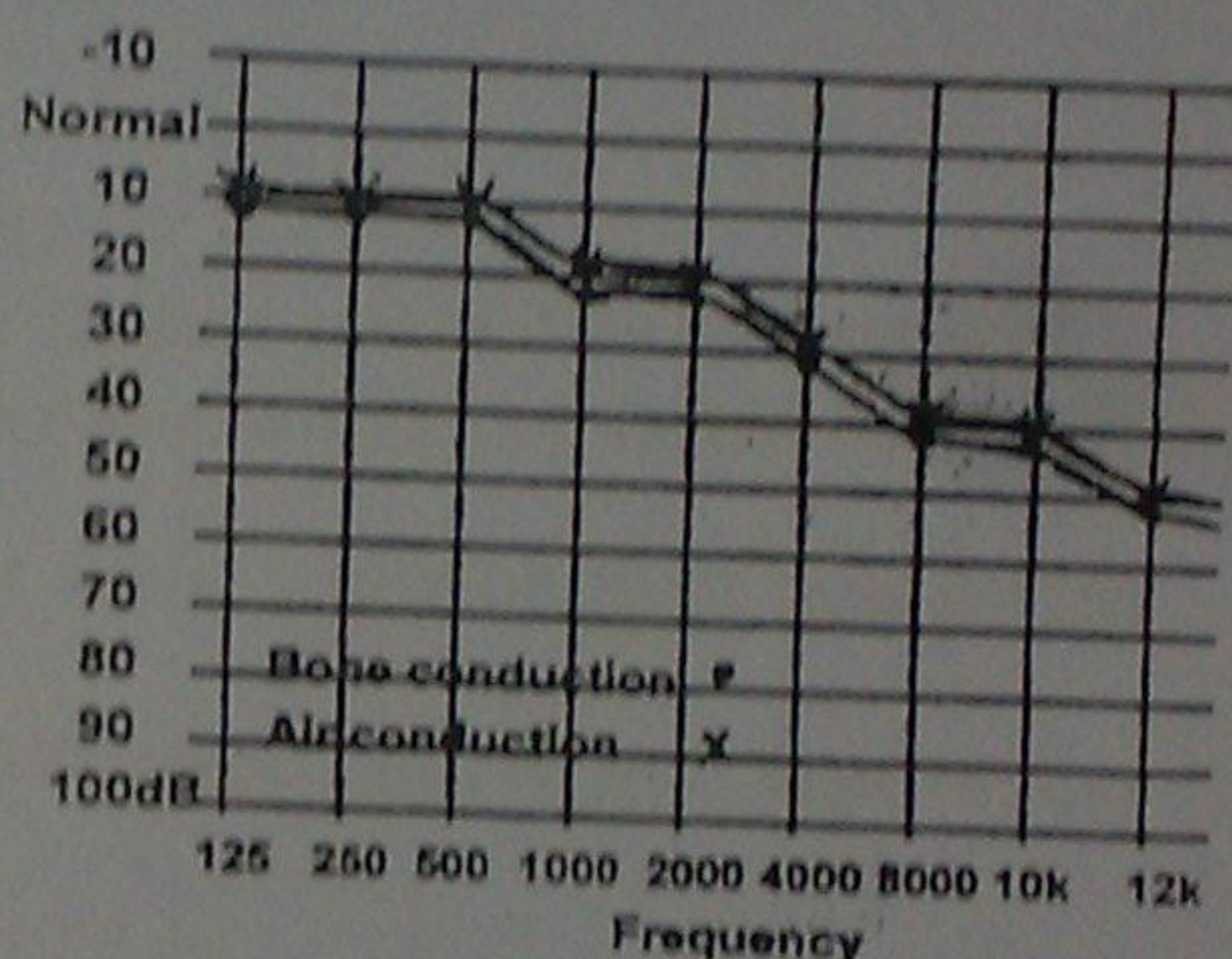
The normal threshold intensity for each tone is zero decibel (db).

If the loudness of a tone must be increased to 20 db for particular tone, the subject is said to have hearing loss of 20 db for that particular tone.





Audiogram of deafness resulting from middle ear disease



Audiogram of the old-age type of nerve deafness

- In conductive deafness, bone conduction audiogram is normal but air conduction curve shows a higher threshold.

In nerve deafness, both curves show impairment of hearing with increased threshold of hearing.

****Presbycusis:** --- auditory acuity with advance of age especially for the high frequency sounds due to --- in the elasticity of different parts of the ear.

At the age of 60 years, there is often loss of hearing 30 db a frequency of 7000 Hz i.e. the sound intensity at that frequency should be increased 1000 times than normal in order to be heard.

****Air conduction audiogram** measures the sensitivity of external, middle, cochlea and auditory nerve.

****bone conduction audiogram** measures only the sensitivity of cochlea and auditory nerve.

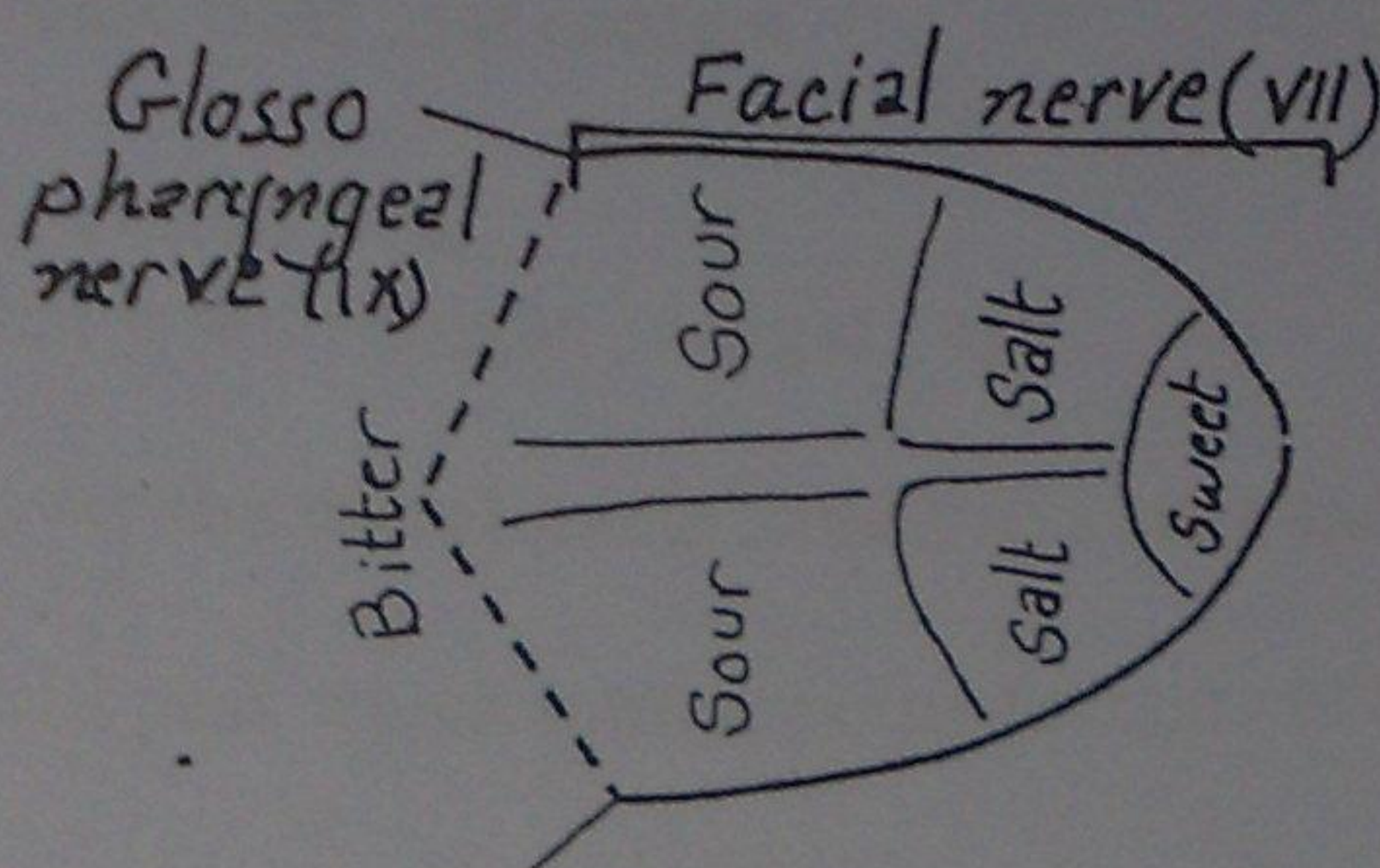
Revise types of deafness and its causes . routes of hearing . and hearing pathway from theoretical notes

Taste (Gustatory) sensations

Tested substance must be in solution in saliva

The Basic taste modalities are four:

- Sweet e.g. 5 % sucrose at tip of the tongue
- Salt e.g. 5 % NaCl on the side anteriorly
- Bitter e.g. 0.5% quinine sulphate at the back of the tongue.
- Sour e.g. 1 % acetic acid along the edges of tongue



*Method:

- 1) 1st dry the tongue using clean cotton.
- 2) Test different sites of the tongue for these 4 modalities of taste with the help of a mirror to determine the location where you tasted each solution.

** Destruction of glossopharyngeal nerve → loss of bitter taste on the affected side:

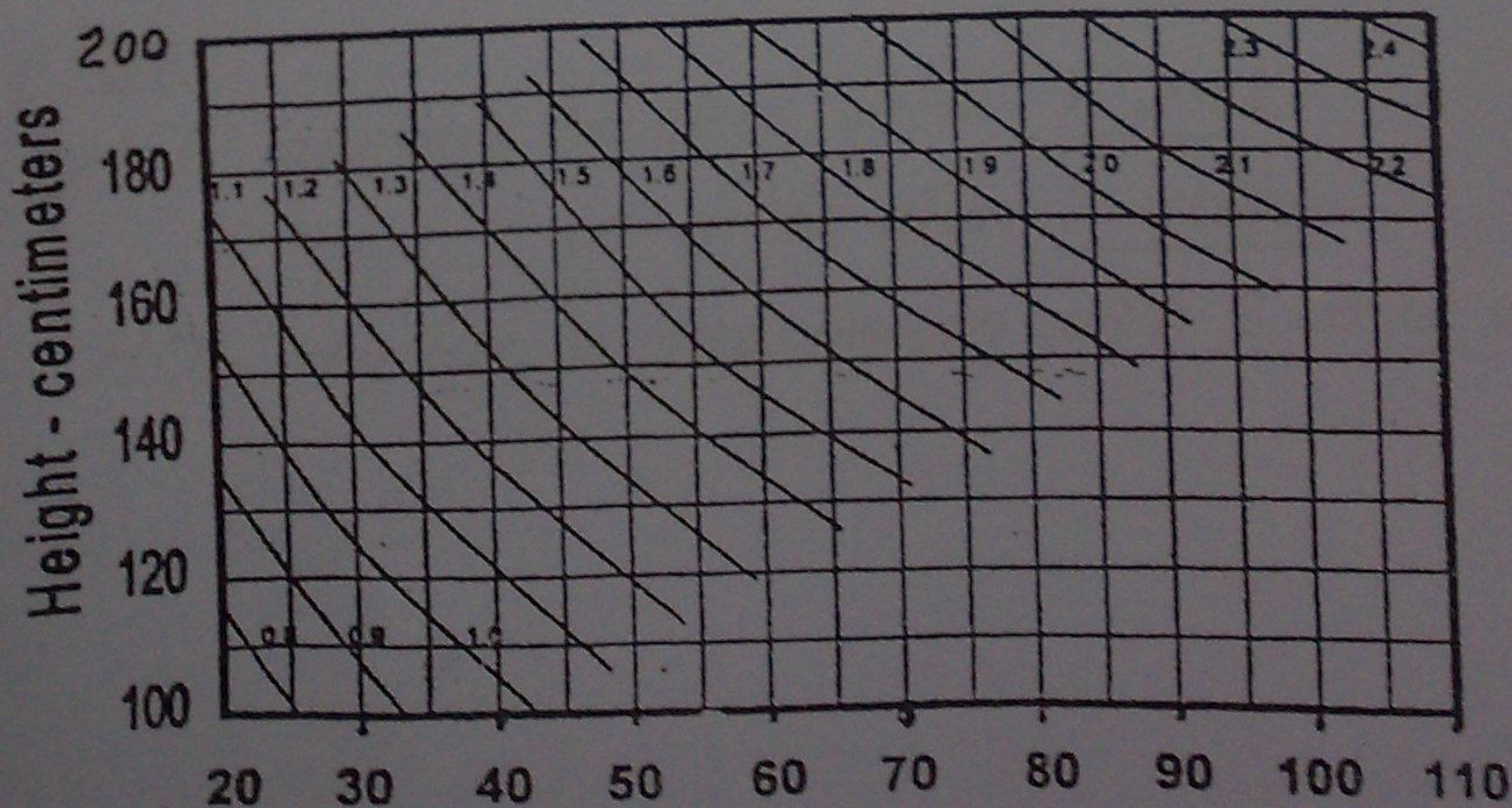
** Destruction of facial nerve → loss of sweet, salt & sour taste on the affected side.

Types, distribution of papillae: see theoretical notes.

NB: taste buds are found in dorsum of tongue, epiglottis, pharynx, larynx.

Determination of body surface area

From the intersection of height & weight on the Dubois chart, the surface area of the body in square meters can be determined.



body mass index (BMI) = $\frac{\text{weight in kg}}{\text{Square height in meters}^2}$

- Normal (BMI) = 20-25% in males
= 19-24% in females
- Overweight (BMI) = >25% in males
= >24% in females
- Obese (BMI) = >30% in males
= >29% in females

Body fat monitor :

Apparatus used to calculate BMI, fat content

Steps :

- click on/off button to switch it on.
- then click set, and feed it with height, weight, age.
- place your thumbs over the metal parts, and press start and extend the arms.
- an electric current will pass which measures the fat content through *resistance*

Pregnancy test

Principle - Based on detection of human chorionic Gonadotropin which is produced in the female in early pregnancy by the trophoblastic cells of the placenta. *maintain corpus luteum till placenta develops like LH*

Immunological test : - Based on antigen - antibody reaction.

- HCG is the antigen, and the antibody is prepared from serum of rabbits immunized against HCG [antiserum].

Procedure :

- one step procedure in which agglutination means positive result [HCG is present] or pregnancy.

- if no agglutination then no HCG [Not pregnant].

Place *one* drop of the reagent [Latex coated with HCG antibodies] *to one drop of* urine, mix well with a stirrer or glass slide.

Wait for 2 minutes and observe for agglutination.

Notes

HCG appears in blood after 1 week

in urine after 2 weeks

HCG reaches a maximum after 8 weeks after conception

secrete testosterone from
Testes of foetus
[24 Sep
Diff. brain
Descent
of Testes
prevent
foetal
rejection

Subjects to be reviewed

Sensory nervous system :

Receptors – types of nerve fibers.

Pathways

Sensations.

Sensory lesions.

Types of pain , referred pain .

Temperature .

Motor nervous system :

Stretch reflex .

Polysynaptic spinal reflexes.

Superficial . deep . postural reflexes .

UMNL , LMNL .

Ataxia . Parkinsonism .

Vision :

Functions of iris . near response . light reflex .

Errors of refraction

Causes of miosis . mydriasis.

Pathways [visual – light – and accommodation] .

Visual field . acuity .

Optic disc . blind spot .

Colour vision . colour blindness .

Hearing

Tests , audiometer & deafness

Taste

Types , distribution , tests & pathway

Metabolism

MR and Basal metabolic rate.

RQ , R & SDA

Reproduction

Pregnancy tests

Functions of placenta.

Kidney

Plasma clearance

Renal function tests

Good Luck

Basal metabolic rate

Def. Rate of energy expenditure (heat production) in Kcal
Per hour
Per square meter surface area.

Under basal conditions:

1- complete physical and mental rest. without sleep. as sleep decrease it by 10%. lying awoken

2- Post-absorptive state [12 - 14 hour after last meal]. to avoid SDA [Specific dynamic action]. before breakfast

3- Comfortable external temperature. neither shivering nor sweating.

Naked 28 - 31°C Dressed 20 - 25°C

It is unavoidable cost of life (metabolic activity of heart, resp, liver & MT)

It is not the minimal metabolic rate which -- e.g by sleep.

Normally: for adult man = 40 Kcal / hour / square meter [+ - 15]%

- it differs with age, sex [lower in females].

Clinically: it is expressed as % deviation of normal standard.

Eg: if 60 kcal, so it is 50 % increase. i.e +50%

Factors affecting metabolic rate

- Increase MR: - Exercise - food - cold - growth - pregnancy - lactation.

- Decrease MR: - Sleep - fasting - old age. low muscle activity

- Factors increasing BMR: - Hyperthyroidism - fevers - epinephrine - malignancy - polycythaemia.

+ 1°C in body temp. $\longrightarrow$ ++ BMR 13%

Calculation

1 - Put Pt under Basal conditions

2 - Measure O₂ consumption litre per hour

3 - Divide by surface area.

4 - Calculate % deviation from normal

Example Calculate BMR if

- O₂ consumption in 6 minutes = 1470 ml

- body surface area = 1.6, standard BMR = 40 kcal / h / m²

The answer:

- O₂ consumption in 1 hour = 14 700 ml, = 14.7 litres.

- so energy produced in one hour = 14.7 x 4.8

- then divide by BSA = BMR = 44 Kcal / h / BSA

- so it increased by 4, = 10 % increase.

موقع مسلم طيب



www.lain.net